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PLANETARY PHENOMENA FOR JULY AND AUGUST, 1908.

By Malcolm McNeill.

PHASES OF THE MOON, PACIFIC TIME.

First Quarter..	July 6,	$12^h 25^m$ P.M.	First Quarter..	Aug. 5,	$1^h 40^m$ A.M.
Full Moon......	" 13,	1 48 P.M.	Full Moon......	" 11,	8 59 P.M.
Last Quarter...	" 20,	4 2 A.M.	Last Quarter...	" 18,	1 25 P.M.
New Moon.....	" 27,	11 17 P.M.	New Moon.....	" 26,	2 59 P.M.

The Earth reaches its greatest distance from the Sun on July 2d at about 11^h A.M., Pacific time.

Mercury is not in good position for naked-eye observation during July and August. It is an evening star on July 1st, but is very close to the Sun, and passes inferior conjunction on July 4th, becoming a morning star. It then moves away from the Sun toward greatest west elongation, reaching that point on July 25th. The planet's apparent distance from the Sun is then 19° 51′,—a much smaller greatest elongation than the average because it occurs less than four days after perihelion. It then rises a little less than an hour and one half before sunrise, and may be seen in the morning twilight for a few days. It then moves out toward superior conjunction, reaching it on August 20th, and becoming an evening star, but does not reach a sufficient distance from the Sun to be seen in the evening twilight before the close of the month. *Mercury* is in conjunction with *Venus* on July 15th, with *Neptune* on July 28th, with *Jupiter* on August 18th, and with *Mars* on August 20th, but none of these conjunctions can be observed with the naked eye on account of the proximity of the planets to the Sun.

Venus on July 1st is, like *Mercury,* an evening star, very close to the Sun, reaching conjunction and becoming a morning star on July 5th. The distance between Sun and planet increases very rapidly, so that by August 1st *Venus* rises considerably more than two hours before sunrise, and by the end of the month the interval is a little more than three and a half hours. The planet will reach its greatest west elongation before the middle of September. The planet will again be very bright in late July and early August, reaching the maximum on August 11th. As in the previous May, it will then be bright enough to be seen by the naked eye in full sunlight. It is not easy to find, but when once seen in daylight it seems so conspicuous that one wonders at the difficulty in finding it. It is easiest picked up when the sky is clear but partially covered with drifting clouds. One can keep his eye on a rift in the cloud as it gradually passes over the place where the planet is known to be, and thus find the planet more easily than he can when there is no cloud.

Mars is too near the Sun throughout July and August to be easily seen. It is still an evening star on July 1st, and then sets only about an hour after sunset. As the planet by this time has gradually faded away to about the brightness of the pole-star, it will not be an easy matter to see it in the evening twilight. The distance between *Mars* and the Sun gradually diminishes until conjunction is reached, on the night of August 21st, and the planet becomes a morning star. The distance between Sun and planet then increases, but does not become great enough to permit the planet's being seen in the morning twilight until some time after the end of the month. At the time of conjunction with the Sun the distance of *Mars* from the Earth is 248,000,000 miles. This is more than 10,000,000 miles greater than it is at an average conjunction, since both the Earth and *Mars* are at nearly their maximum distance from the Sun, the Earth having passed aphelion on July 2d, while *Mars* will be in aphelion on September 3d. At the last opposition, in July, 1907, *Mars* was near perihelion while the Earth was in aphelion, but both were then on the same side of the Sun, and they were much nearer together than at an average opposition. The same thing will occur at the next opposition, late in the summer of 1909.

Jupiter sets at about $9^h\ 30^m$ P.M. on July 1st, about two hours after sunset, and may be easily seen in the evening twilight, but its apparent distance from the Sun is lessening rapidly, so that by the end of the month it is only about 12° distant and it sets only forty minutes after sunset. As it is one of the brightest of the planets it may possibly be seen close to the horizon about half an hour after sunset, but only under the best of atmospheric conditions. Conjunction with the Sun occurs on August 17th, and the planet becomes a morning star. By the end of the month it has moved far enough away from the Sun so that the conditions of visibility are a little better than they were at the beginning of the month.

Saturn rises at about midnight on July 1st, and at about 8^h P.M. on August 31st. It is in the constellation *Pisces,* and moves slowly eastward until July 23d, and then begins to move westward; but the whole motion is only about 1°, an amount hardly noticeable, as there are no bright stars nearby so that small changes in position can be marked. As seen in the telescope, the rings appear about as they did during June, but the Earth in its annual motion begins to draw nearer the plane of the rings during August, and there will be slight narrowing, which will continue until December.

Uranus comes to opposition with the Sun on July 7th, and will then be above the horizon throughout the entire night. By the end of August it sets at a little before 1^h A.M. During the two months' period it moves about 2° westward in the constellation *Sagittarius,* and is about 5° north of the most eastern star in the bowl of the "milk-dipper," not far from a line between that star and π *Sagittarii,* and nearer the latter.

Neptune comes to conjunction with the Sun and becomes a morning star on July 6th. It remains in the constellation *Gemini.*